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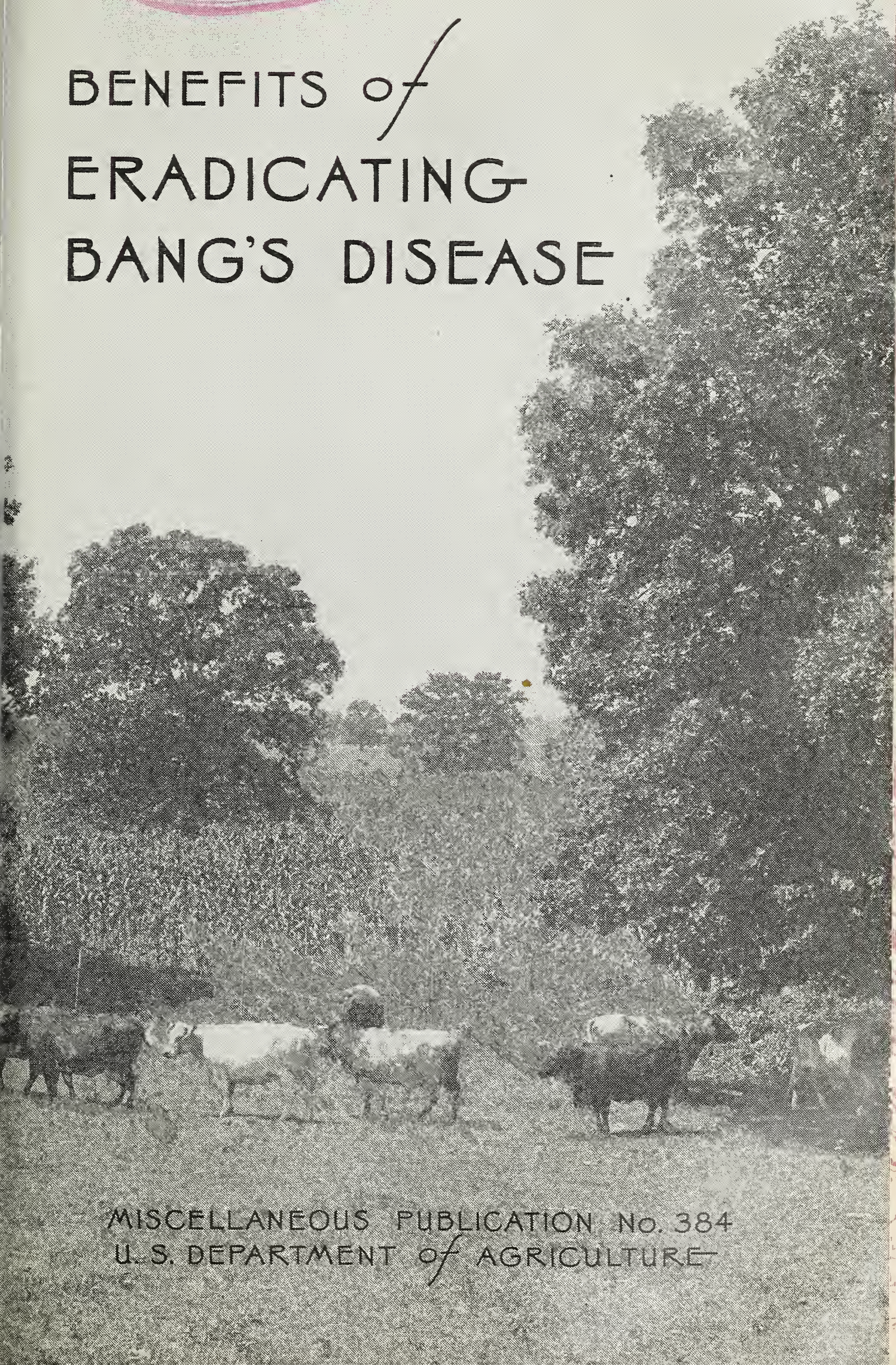
BENEFITS of ERADICATING BANG'S DISEASE



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U. S. DEPARTMENT of AGRICULTURE

BENEFITS OF ERADICATING BANG'S DISEASE

By John R. Mohler, *Chief, Bureau of Animal Industry, and* A. E. Wight, *Chief, and* Elmer Lash, *senior veterinarian, Tuberculosis Eradication Division*[1]

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EXTENT OF BANG'S DISEASE IN THE UNITED STATES

The eradication of Bang's disease,[2] which began on a systematic basis in 1934 under combined Federal and State supervision, was patterned after the bovine tuberculosis-eradication campaign, which was then making rapid strides toward practical eradication of the disease. Thus, with the practical eradication of bovine tuberculosis in many States, Bang's disease was coming to the forefront as the Nation's most serious disease affecting cattle. Before systematic eradication of Bang's disease began, estimated losses from that malady amounted to fully $50,000,000 annually. The principal causes of loss were lowered milk production and high death rate of calves. The disease was prevalent in practically every part of the United States. Throughout the country as a whole about 10 percent of all cattle were affected, according to an official estimate.

Figure 1 portrays the approximate extent of Bang's disease in cattle, by States, at the time eradication work began in July 1934. The data are based on information obtained by employees of the Federal Bureau of Animal Industry and State officials assigned to the Bang's disease project. The data and estimates on which this map was based were limited and for some areas were rather meager. However, as a whole, the map represents fairly well the extent of the disease throughout the United States. The survey was the first of its kind conducted by the Bureau in connection with Bang's disease eradication work.

The varying percentages are believed to be of public interest and also provide a basis for planning the eradication work in the various States. It is noteworthy that the lowest extent of infection was 3 percent and the highest 22 percent, also that infection in some range States where beef cattle predominate was about as high as in several States where dairying is well developed.

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[1] Acknowledgment is made of the valuable assistance rendered by livestock owners throughout the United States who have furnished material used in this publication.

[2] Information regarding the characteristics of Bang's disease, losses caused, and methods of control may be obtained from the following publication: Buck, John M. BANG'S DISEASE (INFECTIOUS ABORTION). U. S. Dept. Agr. Farmers' Bul. 1704, 17 pp., illus. 1933.

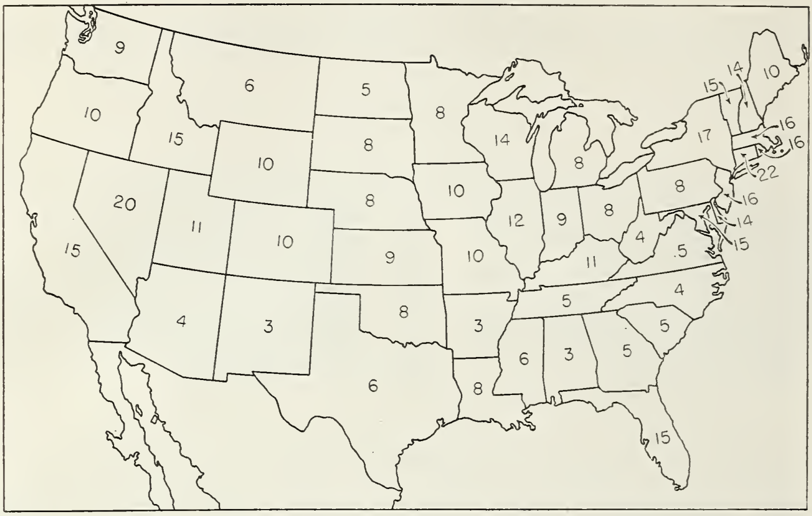

Figure 1.—Estimated percentages of Bang's disease in cattle, by States, when Federal-State eradication work began in July 1934. The average estimated extent of infection among all cattle in the United States was 10 percent.

DAIRY INDUSTRY VITALLY CONCERNED IN BANG'S DISEASE ERADICATION

It is natural that certain features of the eradication program which are of vital interest to cattle owners everywhere should cause spirited discussion. This has brought to light much public interest concerning the menace of the disease to the herd, to other herds in the neighborhood, and to public health.

Dairymen are especially concerned about Bang's disease because of the serious losses that are caused by reduced milk production and loss of calves. Estimates show that in some herds the milk production may be reduced as much as 25 percent, which is a serious consideration in dairy herds. Furthermore, cows in diseased herds, on the average, calve only about once every 20 months instead of once every 11½ months as in healthy herds. In some cases the calf crop in a herd affected with Bang's disease may be reduced as much as 40 percent.

Owners of purebred herds in particular are interested in the eradication of Bang's disease since there are fewer official restrictions on the sale of breeding stock from healthy herds. The requirements for breeding stock, whether dairy or beef cattle, are becoming more strict in their specification that the entire herd from which stock is purchased must be free from Bang's disease, as shown by the agglutination blood test. When a herd is twice tested and all cattle older than 6 months of age are found to be free of the disease, any surplus animals may be marketed to buyers in adjoining States with fewer restrictions than would be placed on untested cattle.

Even if there were no restrictions on the sale of cattle from diseased

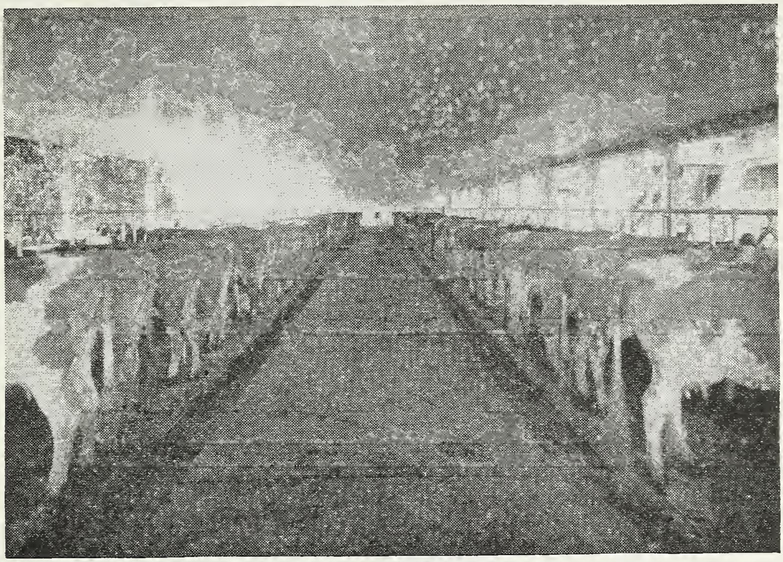

FIGURE 2.—A modern dairy establishment in Florida. Periodic testing of the herd to detect cases of Bang's disease, combined with attention to sanitation, has been largely responsible for the herd's freedom from breeding troubles.

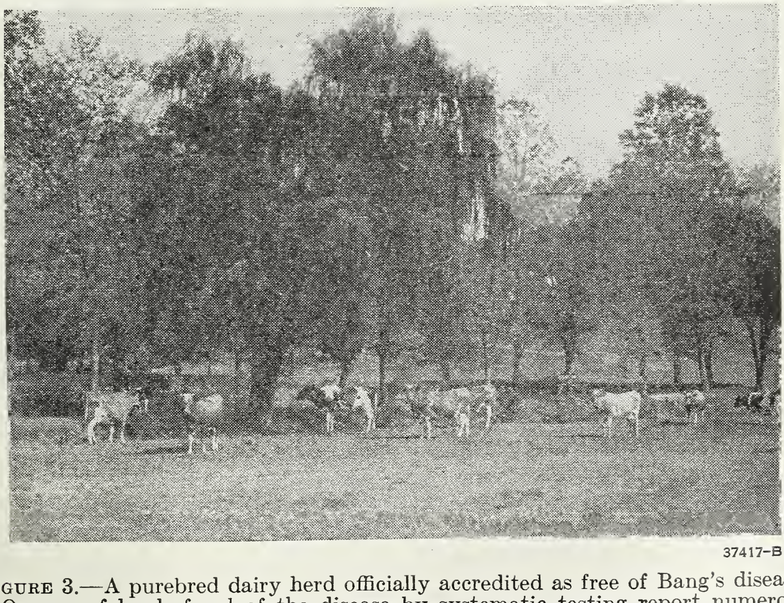

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FIGURE 3.—A purebred dairy herd officially accredited as free of Bang's disease. Owners of herds freed of the disease by systematic testing report numerous benefits, such as increased milk production and greater salability of animals and products.

herds, the eradication of Bang's disease would be a profitable undertaking (figs. 2 and 3). Cattlemen in many States report that dairy cows from Bang's disease-free herds bring, on the average, from $10 to $15 more per head than do similar cows from untested herds. This increase in the value of the animals sometimes is sufficient to offset all the costs of testing.

Another reason for the wide public interest in the Bang's disease program is the increasing number of cities and towns that require the milk supply to come from Bang's disease-tested cows only. These restrictions are due to the considerable number of undulant fever cases, in man, that have been reported in various States. The disease is known to be transmissible from cows affected with Bang's disease to man through the consumption of raw milk from such cows.

INFECTION IN RANGE AREAS AND LOSSES INCURRED

Evidence obtained from reports received by the Bureau indicates that range cattle in areas where lot feeding is practiced during winter months may be seriously affected with Bang's disease. In tests applied to a large number of purebred range cattle in one range State 9.77 percent of them reacted to the test, whereas in herds of purebred dairy cattle in the same State only 4.08 percent reacted. This is contrary to the common belief among cattle owners that all cattle in the range areas are relatively free from this disease.

On the other hand, tests have been applied to thousands of range cattle in areas such as those in New Mexico, where lot feeding during the winter season is not practiced, and in many cases no reactors were found. The percentage of reactors in all herds in such areas was found to be extremely small.

All this evidence indicates that range cattle become exposed to Bang's disease while closely congregated in winter quarters. This result is to be expected, since experience has proved that infection usually occurs as a result of the cattle taking the causative organism into their systems on feed or in drinking water.

GENERAL PROGRESS IN ERADICATION

When the cooperative test-and-slaughter method of controlling Bang's disease had been in operation 5 years, agglutination blood tests, including many retests, for the disease had been applied to approximately 34,000,000 cattle. The total number of reactors removed in this time was approximately 1,800,000. Figure 4 shows the percentage of dairy and breeding cattle over 6 months of age that had been placed under supervision in the Bang's disease-eradication project in the various States, as of November 1, 1939. The average percentage for the country at that time was about 21, but it will be noted on the map that in several States the percentage is much higher.

In many States, Bang's disease eradication work has been taken up on the county-wide or so-called area basis, and in a number of counties all the cattle have received the initial test for Bang's disease. In some counties a second complete test of all the cattle has been made. The United States Livestock Sanitary Association adopted regulations providing for modified accredited Bang's disease-free areas, December 8, 1939. These regulations were approved by the Bureau of Animal Industry of the United States Department of Agriculture, December

12, 1939. When all the cattle 6 months of age or over, except steers, in a designated area have been tested and Bang's disease is found to exist among such cattle not to exceed 1 percent and the herd infection does not exceed 5 percent, the county may be declared a modified accredited Bang's disease-free area for 3 years by the cooperating State and Federal officials. The infected herds shall be placed in

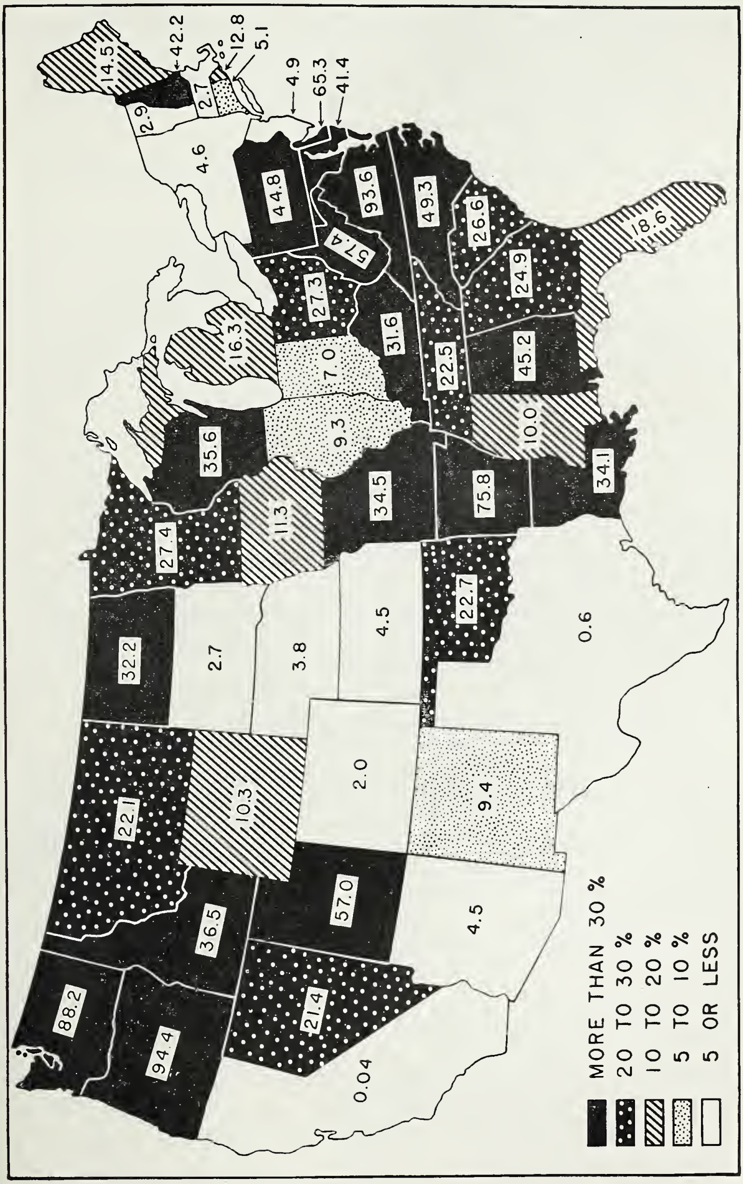

FIGURE 4.—Percentages of breeding cattle over 6 months old under official supervision for Bang's disease, by States, November 1, 1939.

quarantine and the cattle in such herds shall be retested for Bang's disease as required by the regulations.

On February 1, 1940, the Bureau of Animal Industry placed 209 counties in the modified accredited Bang's disease-free area and in April, 59, a total of 268 counties, located in 20 States. In these counties, the cattle numbered about 2,200,000. Additional counties will be declared modified accredited Bang's disease-free areas from time to time as they become so qualified. On April 1 area work was being conducted in about 250 additional counties.

NUMBER OF TESTS REQUIRED TO FREE HERDS OF INFECTION

Livestock owners enrolled in the Bang's disease project frequently ask how many tests will be required to free their herds of this disease. Since each farm presents a different condition as to sanitation, water supply, and management, a dependable answer cannot be given, in advance, regarding any particular herd. One condition that must be controlled, if the disease is to be eradicated from a herd with a few tests, is the proper disposal of barn and barnyard drainage because millions of the Bang's disease bacilli are expelled when a cow aborts and in many instances for at least a month afterwards. It is extremely important, therefore, to follow a plan of sanitation that will prevent these organisms from polluting the feed and water, as these are the principal sources from which the disease is spread. Means should be provided by which hay or other feed will not be trampled by caretakers whose shoes are contaminated by material expelled from an infected cow. The handles of shovels, forks, or similar implements used for manure should be painted red, as a caution, in order that they may be easily identified and not used for handling feed. A container filled with disinfectant should be provided for the immersion, when not in use, of such implements used for handling manure.

Another factor commonly encountered which prevents herds from being readily freed of this disease is the addition of animals to the herd, contrary to procedures agreed upon between the Bureau and the herd owner when his herd is placed under supervision. Failure to observe proper precautions in making herd additions is also one of the many causes for reinfection in connection with cooperative Bang's disease-eradication work.

As an indication of the effectiveness of testing and retesting in eliminating Bang's disease from herds, table 1 is presented. It con-

TABLE 1.—*Effectiveness of repeated testing of herds of cattle in reducing the incidence of Bang's disease and bovine tuberculosis*

Test	Results obtained with agglutination test for Bang's disease [1]			Results obtained with tuberculin test for tuberculosis [2]		
	Cattle tested	Reactors		Cattle tested	Reactors	
	Number	*Number*	*Percent*	*Number*	*Number*	*Percent*
First	237, 094	60, 917	25. 7	58, 102	15, 014	25. 8
Second	193, 617	10, 467	5. 4	52, 650	3, 662	7. 0
Third	198, 560	8, 749	4. 4	56, 457	1, 583	2. 8
Fourth	202. 700	5, 149	2. 5	25, 852	480	1. 9

[1] Based on 10,567 herds for each test.

[2] Based on 1,882 herds for each of the first 3 tests and 918 herds for the fourth test.

tains data obtained from more than 10,000 herds tested 4 times and shows the rapidity with which the percentages of reactors declined during the series of tests.

Since most livestock owners in this country are familiar with the tuberculin test and the results obtainable following its application, table 1 includes comparative data showing results obtained in freeing badly infected herds of cattle from tuberculosis early in the cooperative campaign against that disease. In general, the table shows the effectiveness of each test in detecting diseased animals, and indicates also that Bang's disease is slightly more resistant than tuberculosis to eradication measures. This observation confirms extensive experience in dealing with both diseases.

Table 2 presents further evidence on the efficacy of the agglutination test as a means of diagnosis in herds badly affected with Bang's disease. This table is based on records of tests administered to 15 herds, each containing 15 or more animals, in which the infection was at least 15 percent. The cases were taken alphabetically from the Bureau's files in one of the Midwestern States and are considered representative of many similar cases.

TABLE 2.—*Results of Bang's disease testing of 15 herds having initial infection of 15 percent or more*

Herds (Number)	Cattle	Cattle found to be infected on—			
		First test	Second test	Third test	Fourth test
	Number	*Percent*	*Percent*	*Percent*	*Percent*
4	112	28.6	0		
7	250	34.8	4.8	0	
4	197	32.0	8.1	4.6	0

PAYMENT FOR BANG'S DISEASE REACTORS

The Bureau of Animal Industry is cooperating with the various States in partially reimbursing cattle owners for losses incurred in connection with the slaughter of animals that react to the Bang's disease test. Early in the testing campaign the Federal Government provided a major part of the indemnity payments. During the first 5 years of the work Federal indemnities amounting to $43,000,000 and State indemnities amounting to $2,500,000 were paid to the owners of Bang's disease reactors. Under present Federal statutes the Bureau is not permitted to make indemnity payments to owners for the slaughter of Bang's disease reactors unless the State or municipality pays a sum equal to or greater than that paid by the Bureau. Payment is made on the basis of one-third the difference between the appraised value and the salvage, not to exceed the amount paid by the State, or $25 for a grade and $50 for a registered purebred animal.

REPORTS OF CATTLE OWNERS AND OTHERS

The information presented on the preceding pages is from official sources and provides a substantial scientific basis from which to judge the dependability of testing methods and the soundness of other features of the work. An additional and highly important feature of Bang's disease eradication is the attitude of the public and particularly cattle owners and others directly affected. During the progress of the work the Bureau has received numerous reports of experiences including benefits derived. These reports have been briefed and are here presented in groupings based on the principal form of benefit derived. Necessarily the data offered in such reports lack the measure of scientific precision obtainable under controlled experimental conditions. However, all reports are from sources believed to be reliable and those presented are indications of results which other cooperators in this work may reasonably expect.

INCREASED VALUE AND SALABILITY OF BREEDING STOCK

The manager of a large dairy herd in Colorado writes:

> Through the cooperation of the Federal Government * * * we have cleaned up our herd and find that it has been a very profitable venture from the standpoint of marketing our product, as well as very definitely increasing the value of any breeding animals we sell.

In Tennessee, owners of both beef and dairy cattle have been successful in eradicating Bang's disease from their herds. Here are two typical statements as to increased value of their breeding stock:

> Since testing out my herd I have a demand for surplus animals at a premium of $10 to $25 per head. I think Bang's eradication is going to be worth thousands of dollars to the livestock industry.

> No herd can be profitably operated unless it is free from this disease. Furthermore, the public generally is beginning to appreciate the value of the Government program and is refusing to purchase breeding stock from any except those herds which are known to be free from Bang's disease.

One Kansas herd owner states that he had trouble with his herd about 20 years ago, and fought Bang's disease for a number of years but finally had to sell his entire herd to get rid of the disease. He adds:

> If I had had to do that with my present herd, it would have ruined me. Bang's disease eradication also means about $25 more per head on the sale price of my breeding stock.

Says an Ohio herd owner:

> We had some Bang's disease in our herd when we started testing and had missed sales on account of not having accredited cattle. Since we have eradicated Bang's disease from our Jerseys we can command better prices and also have safe milk and cream for home use and for sale.

An Oklahoma breeder who had 40 percent of his beef herd react to the Bang's disease test during 2 years when his herd was under the supervision of State and Federal officials made this statement concerning the increased value of healthy animals:

> It has been necessary for us to pay from $10 to $15 more for each grade cow out of a Bang's free herd, and from $25 to $50 more for purebreds. However, I consider that either grades or purebreds from an accredited herd are worth one-third more than animals purchased from herds that are not accredited or free from Bang's disease. There is no comparison between calves now and during the years when we were blood testing for Bang's disease in a more or less haphazard way. Our calves are healthier, look better, and sell better. The fact that we have an accredited herd has brought us many more buyers for both bulls and females than we would have had otherwise.

And typical of other States as well, come these two reports from Pennsylvania, the latter being from a county commissioner:

> My herd has slightly increased in number and tripled in value. I attribute 25 percent of the increased sale value to our clean-up program.
>
> I feel that my herd would inventory $25 more per head at the present time, due to the fact that it has been tested for Bang's disease for a period of 5 years. We also use the milk for our family needs with a greater feeling of safety.

A New York dairyman who had eliminated several reactors to the Bang's test stated that his herd is much more efficient than before the diseased animals were discovered and removed. Further, he writes:

> There is a definite increase in value of sale cattle from a clean herd. As a matter of fact, there is practically no sale for purebred cattle at better than ordinary prices unless they are from negative herds.

An Arkansas cattle owner says:

> I am better able to sell surplus registered cattle at prices considerably higher than I was able to get prior to the time the herd was tested for Bang's disease. The value of the program has been demonstrated to be sufficient in the immediate benefits to warrant continuing it regardless of whether Federal indemnity is paid for reactors or not.

INCREASED CALF PRODUCTION

A Florida dairyman writes as follows with special reference to increased calf production:

> Before we started testing for Bang's disease, more than 50 percent of our calves were dropped before time, or if they were carried to time, they were so weak that we could hardly raise them. Since our herd is clean, we do not have more than 1 percent of defective calves, we find they are much easier to raise, and when they are raised they are much stronger and produce more milk.

A member of a Minnesota breeders' association asserts that since the third test his herd has had no reactors or suspects, and that "every cow carries her calf the full length of her gestation period, and the calves are strong and healthy."

A Texas cattleman says:

> Before I started testing for Bang's disease, 25 to 30 percent of our cows aborted each year, and we not only lost the calves but these cows were very poor producers. I believe our production has easily increased 20 percent since we have started testing. In the last year, out of some 300 cows that we have had calve, we have not had over 10 calves that were not strong and healthy.

The following four statements are from herd owners in Missouri:

> I was able to raise only around 40 percent of my calves. Now my calf production is around 95 percent and the herd has scarcely any udder trouble. The average increase of production per cow is from 5 to 7 percent greater than 5 years ago. Personally, we think Bang's disease eradication is very highly necessary from a business standpoint as well as from the public-health standpoint.
>
> When my herd was carrying Bang's disease infection, I got only a 35-percent calf crop; 10 percent of my entire herd were nonbreeders; and 25 percent had to be bred five or six times before getting with calf.
>
> First our calf crop has been almost doubled; second, the milk production has been increased at least one-third for the entire herd. Sterility has decreased to practically nothing, and breeding troubles have decreased to the point where the average time between calving has been reduced to less than 12 months.
>
> Four years ago, before you began the tests of my herd, I lost 90 percent of my calves through Bang's disease. I called on your Department and through your cooperation and consistent testing of my herd, the disease has practically been eradicated. In the past year I have not lost a single calf through Bang's disease.

From Texas comes this statement:

> Our calf crop, as a result of the Bang's disease program, has increased from around 60 percent when we joined the program to 98 percent for 1938, and, in addition to the increase, the quality of our calves is considered better. Our herd as a whole has improved in general health and, as a result, the value of our cattle has increased.

A New Hampshire herd owner states:

> We feel that we have benefited from the testing of our herd for Bang's disease, as we have lost no calves since our herd has been tested and we have less breeding trouble.

Referring to his loss of calves before and after testing his herd for Bang's disease, a Montana cattleman states:

> Prior to the time that the United States Bureau of Animal Industry tested and cleaned up my breeding stock of Bang's disease, I had been losing 30 percent of my calves by abortion. Last spring after my cattle were practically clean, I lost 2 calves out of 311 cows. My opinion is that Montana stockmen lose more money running untested herds than by any other cause.

Another Montana cattleman says that since the elimination of reactors from his herd there have been no abortions, that the calves are now coming healthy and strong, and the cows have needed no help in calving. He adds:

> Our cows have shown no signs of any trouble the past two seasons and only wish we had consulted the State and Federal Bureaus of Animal Industry years ago, as contagious abortion has cost us hundreds of dollars in past seasons.

A Louisiana landowner and cattleman says that his herd was badly infected when the first test was made, as there were 58 reactors out of 197 tested, but after the infected cows were removed his calf crop was 90 percent whereas it was only 65 the previous year.

Learning that Bang's disease was prevalent among the cattle that mingled with his herd on the open range in Wyoming, the owner of several hundred beef cattle applied for the Bang's test. Here is his report:

> Since the testing I have greatly reduced the losses in my herd * * * and I can wholeheartedly recommend to cattle owners in Wyoming, as well as other States, to take advantage of the testing. It is of vast economic importance to eliminate this disease and insure a vigorous calf crop which is so essential to a successful cattle business.

An Alabama cattleman, who had been getting a very low calf crop, decided to apply the Bang's test to his herd, and writes that in his opinion it is useless for anyone to try to stay in the cattle business without it. "If the Bang's test had not come when it did," he concluded, "I would have been forced out of business."

MILK PRODUCTION IMPROVED

Healthy cows are better able to yield a maximum flow of milk than cows that are diseased in any way. The following statements from dairymen in various States are representative of a large number of experiences on the point:

> I found that blood-tested cattle give from 15 to 20 percent more milk. I have also found that my tested herd breeds better, and not having a bull of my own, I save trouble and expense trucking them less often.

> I am well pleased with the work which has been accomplished on my herd in an effort to eliminate Bang's disease. As a dairyman, I have found this work especially

beneficial, for not only has my calf crop increased, but my herd has shown, since the work was begun, an increased production of milk as well.

My breeding and calving troubles have been reduced 80 percent with consequent increase in milk production.

I am producing more milk with fewer cows than before the test, and my calves are of a better grade than before the Bang's test.

We find that by ridding our herd of these diseased animals we have been able to increase our production at least 40 to 50 percent, which to us is gratifying, for at this particular time so many demands are being made for milk from tested herds.

Before the first test over 50 percent of my cattle had aborted and some of them would not get with calf. Since my herd is clean I have not lost a calf and the cows produce much more milk. I have no breeding troubles.

Since getting rid of all Bang's infected cows, I am getting about 20 percent more production from the same number of cows.

Bang's disease losses amounted to $5,000 in one dairy herd in Wisconsin, and the owner tells of spending hundreds of dollars for so-called cures which proved to be worthless. He writes further:

Since eliminating the reactors we have had no losses or reactors and the milk production has increased 15 percent. We have saved six crops of heifers.

HEALTHY REPLACEMENTS FOR MAINTAINING HERDS

An Oregon owner of a large herd believes that the replacement feature represents, in large part, the determining factor of keeping a herd free of Bang's disease. He makes this statement:

We have found the ideal procedure to be the raising of our own calves without outside replacements; but if the latter procedure is necessary, there is the obvious need of a probationary isolation system.

An owner of a herd of 250 cows in North Carolina, which was found to have 55-percent infection of Bang's disease in 1934, but has been entirely negative since March 1935, as determined by regular tests, expresses himself as being "frankly delighted with the results achieved." He adds:

In making replacements in our herd, we used every precaution possible to keep from becoming reinfected. Only clean animals from accredited herds were purchased and upon arrival they were isolated for retests. Maternity pens were used before and after calving, and these pens were thoroughly disinfected and left open for a period of time. We know a negative herd can be achieved and maintained if the proper precautionary measures are taken (fig. 5).

In North Carolina a breeder of purebred Holstein-Friesians experienced difficulty in keeping his herd free of Bang's disease until he disposed of every suspect and positive animal on the place. He writes:

Being rid of this most dreaded disease, and having a clean foundation herd to build on, we were encouraged to go ahead and improve our herd by securing the best bulls we could find, breeding them to our best cows, and raising the offspring for replacements. As a result our cattle have more than doubled in value, production has increased, and we get more satisfaction out of working with a clean herd where we can see the improvement and know that the improvement is permanent.

A New Mexico dairyman states that the milk production of his herd was almost as great with the reactors removed as before the elimination of the reactors. This herd presented a striking instance of loss of production in both milk and calf crop which had been remedied by careful application of the Bang's disease test.

A Florida herd owner says:

> We find very definite results in the greatly decreased number of retained placenta at calving time, with a definite increase in milk. Our calf crop has been larger and the calves stronger, as fewer are dropped prematurely, which has been very valuable to us as we have been improving the quality of our herd. Due to our freedom from Bang's disease, we are able to enter our purebred Guernseys in auction sales from which we were previously barred.

Two Arkansas cattle owners make these statements regarding replacements:

> Since the herd has had several negative tests, we have had no trouble in raising calves for replacements.

> I am well pleased with the Bang's disease program which has made it possible to clean the herd of infection without any great financial loss and has made it possible to be better able to purchase satisfactory, tested replacements for the herd.

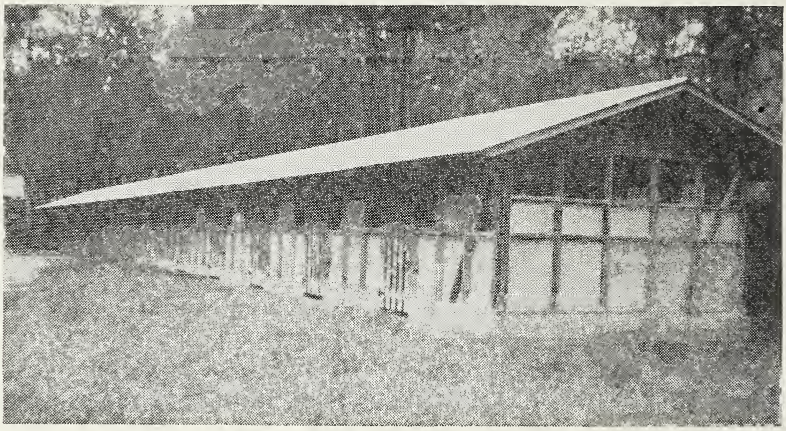

FIGURE 5.—Maternity stalls isolated from the dairy barn. These pens are of a construction that can be thoroughly cleaned and disinfected as an aid in controlling Bang's disease.

SANITARY MEASURES VITALLY IMPORTANT

In some instances where Bang's disease has been difficult to eradicate the source of trouble has been due to drainage from a source of infection (fig. 6). Here is a case from West Virginia which is typical of similar ones reported from other States:

> The barn is of modern construction, equipped with maternity stalls and kept in excellent sanitary condition at all times. Factors that might have a bearing on the persistance of the disease were considered, with special reference to replacements. It was later discovered that a drain from the barn emptied into a ravine and that the field in which it was located served as a night lot for the herd during the summer season. This situation was remedied and from that time rapid progress was made in eliminating infection from the herd, which has now been clean on a series of retests at 90-day intervals.

From Wisconsin comes this statement:

> We are 100 percent for officially supervised blood testing. No breeder of dairy cattle can afford to be otherwise. Our biggest danger, perhaps, is the unconvinced neighbor who is blind to the insidious workings of this disease. Through criminal carelessness he may float a new dose to us down the creek, or allow some hound to drag a fetus around.

There is no intention of overlooking the fact that in a small percentage of cases much trouble is encountered in freeing herds of Bang's disease. However, such herds have been found to be no more numerous than were encountered in connection with the bovine tuberculosis-eradication campaign. Why considerable difficulty is encountered is not always readily explained but sanitary and management considerations, in large degree, have been found to underlie difficulties in promptly freeing herds of infection. Reports on such herds are often lacking in certain essential details which should be available if a proper interpretation of the cause is to be made.

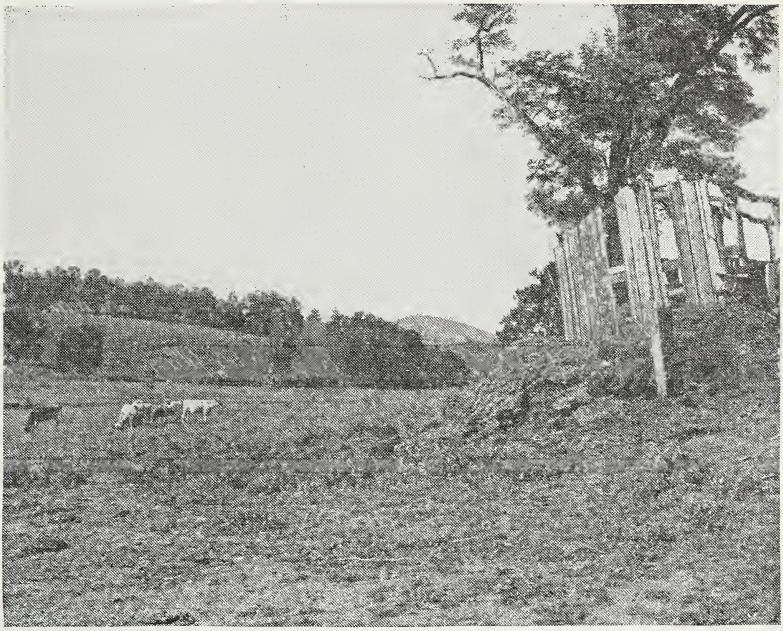

Figure 6.—Animals grazing on pasture that receives drainage from a manure pile. Conditions of this character are sometimes responsible for the persistence of Bang's disease in otherwise well-managed herds.

Trouble With Diseased Bulls

When the spread of Bang's disease in a herd is due to an infected herd bull, the consequences may be costly to the owner. Here is a statement from a South Dakota dairyman:

> Previous to taking up the testing work, I had purchased a purebred bull for use in my herd. All cows served and settled by this bull aborted premature calves. Three other cows served by a neighbor's bull gave birth to healthy, vigorous calves at full term. On the initial test of the herd, 13 of the 16 cows and the bull in question reacted positively to the test and were removed for slaughter. The other 3 cows passed a negative test and have remained in my herd, passing 3 more negative tests.
>
> Since the first test of my herd over a year ago, I have experienced no further trouble with actual abortions or the other undesirable effects attributed to this disease. My cows all breed regularly and calves are normal, strong, healthy,

and vigorous. Milk production is up to standard and there are no udder troubles in the herd.

The testing program in my herd has been the means of allowing me to remain in milk production, and to maintain a selected and established retail trade.

Regarding the importance of healthy bulls, a Kansas dairyman writes:

At one time we had a lot of trouble raising our calves but we found in checking up that these calves were mostly by one bull, and in our test that bull "went out" and since that time our calves from other bulls are not nearly so hard to raise and look a lot stronger at birth, showing that calves from bulls affected with Bang's disease do not have the vitality that other calves do that come from clean animals.

Eradication From a National Standpoint

The opinions of dairymen and beef-cattle owners have, in most cases, portrayed the individual's point of view. Here is a statement from a breeder who looks at the Bang's disease program from a national standpoint. It comes from Louis J. Taber, master of the National Grange:

The eradication of infectious and contagious diseases in livestock is an essential responsibility of government. The farmers and breeders, however, have a duty to cooperate with the forces of government, and to use the power of teamwork in improving the health, conditions, and standards of livestock throughout the Nation.

The eradication of Bang's disease is the next great forward step demanded to protect agriculture and the consuming public. The people of America are entitled to healthful and disease-free meat, milk, and dairy products. This program can be brought about only by cooperation of the farmers, the county, the State, and the Nation through their proper representatives.

As a livestock producer for a third of a century, and as Master of the National Grange, I am glad to endorse any sound program that improves the health of the Nation and the welfare of agriculture.

Confidence in the Test

There are few cases on record of a second test being made on a herd to check the reliability of the agglutination blood test. An instance of this kind, however, is reported by a Michigan breeder, as follows:

On December 12, 1936, we had our local veterinarian take a blood test and had 29 reactors and 5 suspects. We then applied for a State test which was taken February 12, 1937, and showed 34 head of reactors. This test corresponded identically with the local test which is proof enough that the blood test is all right and is something everyone should do for his own benefit and the benefit of the country at large. We did a very thorough job of cleaning and disinfecting all stables, pens, and yards that the infected cattle had access to, and have a lot of satisfaction in knowing we have a clean herd of cattle, which are producing and reproducing as they should.

Confidence in the reliability of the Bang's disease test is also expressed by a Kansas dairyman, who writes:

We think the test for Bang's is very accurate as a rule. Every cow or heifer that has tested out for us in these tests has either been a reactor sometime previously, has lost a calf, or would not breed regularly, showing me that she was not right before the test.

Reduction in Breeding Troubles

With the clearing up of the disease, a Nebraska breeder says his breeding troubles have vanished also. He adds:

No breeder can afford to tolerate this disease in his herd. It must be eradicated, and the only way to eradicate is to eradicate—destroy. We have not lost a calf now for many, many months. It is a joy to go to the farm and see such a fine bunch of calves as we have now.

A Rhode Island breeder states:

> Since clearing up the herd, I have had no breeding troubles, no loss of calves from abortion, and no retained afterbirths. I believe that the present breeding health of the herd is due entirely to having gotten rid of the disease through the clean-up program.

The following statement is typical of those received from the dairymen in Nevada:

> Since August 1938 we have had no abortions; we are having no trouble with breeding; our calves are healthy; and our production is as much as can be expected from cows on alfalfa hay.

Referring to the Bang's disease test as the most constructive step he has ever taken, a Virginia cattle owner writes:

> We unquestionably have a material increase in breeding efficiency as well as more economical milk production. Our calf losses are practically eliminated and our turn-over in cattle is very considerably reduced. As far as I know there is no demand now for untested cows, but our tested cattle are unquestionably in greater demand now than cattle were in this vicinity before the testing program was begun.

Experiences with Badly Infected Herds

The elimination of Bang's disease from the herd of range cattle owned by a Wyoming cattleman, stopped a series of abortions. He had added 50 range cows to his herd in 1935 and 2 weeks later they began aborting. Then, later, his original cows, with which he had placed the additions, also began to abort. In October 1935 he tested for Bang's disease and found 37 reactors and 1 suspect. On the first retest, he found 7 more reactors and 1 suspect; on the second retest, 3 reactors and 1 suspect—all of which were shipped immediately, after being discovered, for slaughter. No more reactors have been found and no cows have aborted. He adds:

> During the time that our herd was infected with Bang's disease many of the calves were weak at birth and would have to be hauled to the shed and warmed up. Since the herd has been clean, we have not had to haul in a single calf; they have been strong at birth and on their feet and nursing in a few minutes.

A clean herd may easily become infected by the addition of animals that harbor the disease, according to the following statement from an Indiana dairyman:

> We had a clean-herd certificate but lost it through the purchase of two heifers which had been on an extensive show circuit and were negative until after calving when they became positive. They "set our herd on fire." We lost 12 head before we finally got the disease under control. On December 10, 1937, we regained our certificate and are very proud to possess it. We intend to test our herd at least every 6 months in the future, and we shall buy no cattle except from certified herds. The peace of mind alone that one enjoys after getting rid of this disease is worth many times the cost of drawing blood samples.

An Iowa owner of purebred Ayrshires states that he had a badly infected herd in 1934 and was greatly discouraged as he was getting only a few calves a year, and had almost decided to try a widely advertised remedy when he heard of the Bang's disease-testing program. He writes:

> I was the first person in my county to take advantage of the aid offered. I lost 9 head out of my herd of 17, including some very goob puredred Ayrshire cows. Neighbors and friends thought I was foolish to let mygood cows go and I was

> skeptical myself. But now I feel it was the best thing I could have done. With the first test I got my herd cleaned out, so it saved me time, trouble, and money. I thoroughly cleaned and disinfected my barn and yard, and removed old stanchions and flooring. Then I bought 6 head of purebred Ayrshires from a clean, tested herd and now have an accredited herd of 22 purebred Ayrshires. I feel sure that if I had tried the remedy as some others have done, I would still be having trouble and be out quite a bit of cash. By blood testing, I feel safe in using the milk for my family, can raise a nice healthy lot of calves each year, and milk production is much better.

A Georgia breeder of cattle, after trying all kinds of so-called treatments for Bang's disease, placed his herd under State and Federal supervision, and says:

> Within about 1 year after signing the agreement we had a clean herd. This was about 5 years ago. We have not had a reactor since and are the proud holder of an accredited Bang's disease certificate. Our herd was originally about 33-percent infected. It has been a good investment for me to slaughter the reactors.

A Florida dairyman writes:

> Our herd was heavily infected with Bang's disease. Our first test showed about 25 percent reactors and we have not had a reactor since November 1937. We have stopped losing calves from abortions, mastitis has been reduced, and production in general has been increased.

From Alabama came a statement from a dairyman who had suffered some heavy losses and was discouraged when he first began testing. However, after the reactors had been disposed of and his herd was pronounced clean, he wrote:

> We are delighted now that we took our punishment and can enjoy the many benefits of having a herd of over 100 head of registered cattle free from Bang's disease. The results, I think, justify the sacrifice and cost. We are having practically a perfect record in raising calves; we have no breeding troubles; and we have had very little veterinary expense, the herd being unusually healthy.

A Utah cattleman writes that he is "thoroughly convinced the Bang's program has been the salvation of the range cattle industry in his county." In his own herd, which consists of 600 head, an initial test in 1936 showed 12 percent of reactors. By having his herd tested twice annually and the suspects retested in 60 or 90 days, he has been able to clean up Bang's disease in 3 years.

BANG'S DISEASE AND HUMAN HEALTH

Regarding the human health aspect of Bang's disease, a Nebraska herd owner says that he favors making the Bang's test compulsory in the case of dairy herds. He continues:

> I feel that contaminated milk should not be allowed to be sold legally in this State. One of the members of my family contracted this fever disease some 4 years ago and is still not able to get entirely free from it. In this particular case the financial loss in the way of medical care and attention has been a very sizable item and, in addition to that, his loss of time from his business the first year that he contracted the fever was fully 50 percent.

A Pennsylvania dairyman says:

> The reason I believe in the eradication of Bang's disease in cattle is, first, because healthy cattle produce more calves and milk than diseased ones, and, second, because the milk and beef from healthy livestock promote health in the ultimate consumer of such products.

A Massachusetts breeder urges that—

> the whole State should be tested and controlled in the same manner as that done for tuberculosis. By such a program the consumer is protected from fever and the dairyman assured of healthy replacements.

The following is from a Missouri minister's letter:

> My wife was sick practically all summer, sometimes running a fever and at other times her temperature would be below normal, the doctor being unable to make a correct diagnosis as to the cause of her condition. By chance a member of our church had seen a man affected with undulant fever and he advised me that my wife's symptoms appeared the same. The veterinarian in our city, being a close friend of ours, was consulted and he recommended that our only cow be subjected to the agglutination test for Bang's disease, which was done and she proved to be a high reactor. This information was conveyed to our doctor who at once said that this supplied him with the missing link and he requested my wife to come to his office for a blood test to determine whether she was affected with undulant fever. A sample of blood was sent to the State Board of Health, which called for a second sample. Her blood reacted to each test, substantiating our opinion that she was affected with undulant fever, no doubt caused by using milk from our cow affected with Bang's disease.

The preceding statement concerning Bang's disease and human health is similar to conditions encountered by the Bureau's inspectors on farms they visit. It should, therefore, not be considered an unusual incident.

Reports of General Benefits

A Maryland dairyman reports his experience with Bang's disease as follows:

> Unless the owner is willing to take necessary sanitary precautions, however, and be extremely careful in the matter of replacements, there is little wisdom in testing. I purchased an untested herd of cows, which later showed a high percentage of infection. Cattle that responded to the test were slaughtered promptly, and rigid sanitation rules were followed. In a few months we had Bang's disease licked and have since been on the accredited list for 3 years continuously. Having an accredited herd is a very definite financial aid, since extra cows sell at a premium of from $25 to $35 a head, and the calf herd certainly increases rapidly.

The replacement of valuable milk cows that have reacted to the Bang's disease test is a costly procedure but one that is worth while in the opinion of a Louisiana dairyman, who writes:

> I started testing for Bang's disease in 1935. I had about 106 head of dairy cattle, some of which cost me from $100 to $175 per head. Through the test I lost virtually half my herd and could not replace them with the indemnity I got. In spite of this direct loss and the temporary losses in not having milk to supply my customers, I have no regret whatever; in fact, I am more than pleased with the results of the tests. For 2 years now there have been no abortions whatever, the cows are entirely free of udder trouble, and I can regulate the time of calving so as to have milk in the season when the demand is greatest. My cows produce normally and satisfactorily.

An Idaho herd owner says it is entirely possible to clean up a herd and keep it clean, but unless everyone conforms to regulations, the ones who are maintaining Bang's free herds are constantly menaced by others who are indifferent to this vital health problem. He continues:

> After years of experimenting with partial isolation, I found the only sure way was to keep only animals negative to the agglutination test. Since February 1932 I have owned a clean herd, and find the ease in handling barns, sheds, and pastures where all the cattle are Bang's free is worth a great deal, in addition to the breeding strength of the herd. A calf a year from each cow is now our rule.

From New Mexico, where a great deal of the Bang's disease testing has been among range cattle, comes the following comment:

> The greatest benefits I have derived from cleaning Bang's disease out of my herd are realized in (1) eliminating the continual loss of purebred calves and registered cows and (2) the assurance that I am not selling a breeding animal that may start the disease in a customer's clean herd.

A Maryland dairyman reports:

> The elimination of Bang's disease from our purebred herd has been very beneficial. Since having a negative herd, our calf crop has been about 97-percent normal calves, purebred sales have doubled, and milk production has increased and has been more equalized per cow.

The following comes from a Kentucky cattle breeder:

> Since having my herd under supervision and on the accredited list for Bang's disease, we have had scarcely any trouble at all from udder disorders. In a breeding program such as we try to carry on, it is most discouraging if loss occurs through premature birth of calves. Also, from experience, my 2-year-old heifers seem to be the most vulnerable animals for Bang's infection and, in addition to the loss of calves, the set-back in the production life of the heifer was almost insurmountable. In the past several years since having become accredited, we scarcely ever lose a calf and udder trouble has disappeared.

An Indiana dairyman writes:

> Our herd is now calving every 12 months—formerly about every 18 months. Udder troubles and retained placenta have almost entirely disappeared from our herd. Our average service per conception of cows is now 1½—formerly it was around 5. We are 100 percent in favor of eradication of Bang's disease by the agglutination test.

SUMMARY AND CONCLUSIONS

The status of Bang's disease eradication and the benefits to be derived as outlined in this publication, may be summarized as follows:

The cooperative Federal-State program of eradicating Bang's disease is effective in freeing both dairy and beef herds of the disease.

Although producing satisfactory results when testing is conducted on an individual herd basis, the program is still more effective and meets with greater favor among most cattlemen when herds are tested on a countywide or area basis.

Even in badly diseased herds, systematic retesting, combined with good management practices, may be expected to result in the practical eradication of the infection within about four tests.

Success in eliminating Bang's disease by the use of the agglutination blood test compares favorably with the success attained in eliminating bovine tuberculosis with the tuberculin test, both tests being used as a means of diagnosis. Typical benefits reported by cattle owners participating in the Bang's disease eradication program include:

Thriftier condition of herds.

Calf crops, in both beef and dairy herds, approximately 20 to 25 percent greater than formerly.

Material increases in the milk production of herds, depending largely on the number of diseased cows replaced by healthy ones.

Noticeable decreases in numbers of cows affected with udder troubles and sterility.

Greater marketability of breeding stock and better prices because (1) purchasers are becoming more and more insistent on disease-free sources of animals, and (2) because of State legislation restricting the entry of untested breeding stock.

Greater marketability of dairy products because of legal restrictions, imposed by States, cities, and towns, on products from untested herds.

Greater safety to human health because of the fact that raw milk from herds infected with Bang's disease may transmit undulant fever.

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